

WHAT IS CLAIMED IS:

1. An optical deflector, comprising:
a supporting substrate having an elastic supporting part;
5 a movable plate having a reflective surface on one side thereof and a magnetic material on another side thereof and supported at both ends thereof by the elastic supporting part so as to be torsionally vibratable around a torsion axis; and
10 a magnetism generating means provided in the vicinity of and spaced apart from the magnetic material, for driving the movable plate relative to the supporting substrate to deflect a light incident on the reflective surface,
15 wherein the another side of the movable plate has at least two recesses, and the magnetic material is provided in the recesses.
2. The optical deflector according to claim 1,
20 wherein the recesses are spaced apart from the torsion axis of the movable plate and are not close to the torsion axis.
3. The optical deflector according to claim 1,
25 wherein the supporting substrate, the elastic supporting part, the movable plate, and the recesses are integrally formed of single-crystal silicon.

4. The optical deflector according to claim 1,
wherein the first side of the movable plate comprises
a (100)-equivalent plane of a silicon crystal, and an
inner surface of at least one of the recesses
5 comprises a (111)-equivalent plane of a silicon
crystal.

5. The optical deflector according to claim 1,
wherein the elastic supporting part has an X-shaped
10 cross section.

6. The optical deflector according to claim 1,
wherein a side wall of the movable plate has a recess.

15 7. The optical deflector according to claim 1,
wherein the recesses each have a substantially
vertical side wall in a cross section taken along a
line perpendicular to the direction of a width of the
movable plate.

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8. The optical deflector according to claim 1,
wherein the recesses are each substantially V-shaped
in a cross section taken along a line perpendicular
to the direction of a width of the movable plate.

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9. The optical deflector according to claim 1,
wherein a cross section of each of the recesses which

is parallel to the second side of the movable plate has a larger area within the movable plate than at a surface of the movable plate.

- 5 10. The optical deflector according to claim 1, wherein the magnetic material has a substantially circular cross section taken along a line perpendicular to the direction of a width of the movable plate.

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11. The optical deflector according to claim 1, wherein, when viewed from above the surface of the movable plate having the recesses formed therein, the magnetic material overlies the recesses.

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12. An optical device, comprising the optical deflector as set forth in claim 1.

13. A display device comprising the optical
20 deflector as set forth in claim 1 and a light source, wherein the optical deflector performs deflection/scanning of a light from the light source to form an image on a projection plane.

- 25 14. A method of producing an optical deflector having a supporting substrate, an elastic supporting part and a movable plate, comprising the steps of:

preparing a silicon substrate having a first side for formation of a reflective surface and a second side;

forming mask layers on the first and the second
5 sides of the silicon substrate;

removing the mask layer on the first side except an area thereof for formation of the supporting substrate, elastic supporting part and movable plate;

10 removing the mask layer on the second side except an area thereof for formation of the supporting substrate, elastic supporting part and movable plate and also removing the mask layer on an area for formation of a recess within the area for
15 formation of the movable plate;

dipping the silicon substrate in an aqueous alkaline solution to perform anisotropic etching to form the silicon substrate into the supporting substrate, the elastic supporting part and the
20 movable plate and to form the recess on one side of the movable plate;

removing the mask layers on the silicon substrate;

forming a reflective film on the first side of
25 the movable plate; and

providing a magnetic material in the recess.